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Nitrous Oxide and Nitrogen Narcotisation of Animals to be Slaughtered According to the Jewish Ritual

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The slaughtering of food animals according to the Jewish ritual "Shechita" is carried out by cutting the neck in one stroke, thereby severing all the soft parts in front of the vertebral column. As a preliminary the animal is thrown down, generally with legs tied and the neck stretched out horizontally.

There can be no doubt, and it is experimentally proved (S. Lieben, V. Sahlstedt *et al.*), that as a result of the cut the blood pressure in the brain is reduced to a very low level and "consciousness," including the sense of pain, is practically instantaneously abolished, while reflex and automatic movements of the legs, governed by medullary centres, will continue for some time and the heart will work on until the animal is bled to a maximum. In spite of the fact that the Jewish method of slaughtering is both rational and humane objections have often been raised against it, and it must be admitted that the throwing of large animals *can* cause some pain although with the precautions observed it very rarely does so.

While in certain countries slaughtering according to Jewish ritual is prohibited, there are others which require that some type of stunning or anaesthesia shall precede the slaughtering of the animal. This raises serious difficulties because Jewish religious laws severely restrict the procedures which can be applied without making the meat "unclean" according to Mosaic and Talmudic law. Stunning by a blow or a shot is out of the question because it is expressly laid down that no bleeding must be observable in the brain or its membranes, and generally it is an absolute condition that before the ritual cutting of the neck the animal must suffer no harm at all likely to be fatal. This, in the opinion of the Rabbis, excludes also the stunning by an electric current through the head.

At the suggestion of Denmark's chief Rabbi, Dr. Friediger, the two Danish authors undertook a study of the possibilities of anaesthesia by inhalation of nitrogen* which, according to the experience both of ourselves and others, causes loss of consciousness in man without any unpleasant sensation whatsoever. While our personal experience both on ourselves and on a number of other persons was gained by gradually reducing the oxygen percentage in the air breathed, Schneider and Truesdell† allowed their 17 subjects to breathe practically pure nitrogen until unconsciousness was impending, and in several of them muscles of the head, arms or legs twitched in the early stage of asphyxial decrease of muscle tone. "Practically all subjects reported that the symptoms of breathing nitrogen were not unpleasant. In this experience one feels quite as though one were undergoing nitrous-oxide anaesthesia. There is no discomfort; during the early stages of the process the voices round about are clear and distinctly heard and the field of vision wide and bright. Soon, however, the voices begin to recede, becoming gradually further and further away, the field of vision likewise grows gradually less bright and narrower and then all fades away. On the return to fresh air there is a feeling of dizziness, with ringing in the ears, sometimes double and dim vision, and again the far-away voices. The vision gradually clears and voices come to be one and that associated with the operator at one's elbow."

We can fully confirm this description and find that even when experiments are carried to complete loss of consciousness there is no feeling of discomfort.

In adapting this type of narcosis to animals to be slaughtered immediately afterwards according to the Jewish ritual three points are

*At the same time Professor Følger, of the Danish Veterinary High School, undertook a comparative anatomical and histological study of animals killed with and without such anaesthesia.

†EDWARD C. SCHNEIDER and DOROTHY TRUESDELL. (1923.) The circulatory responses of man to a sudden and extreme anoxemia. *Amer. J. Physiol.* 65. 379-385.

important: (1) The heart does not suffer but continues to beat for several minutes so that the animals can be bled completely after the neck has been cut, while, on the other hand, recovery is rapid and complete when the animal is allowed to breathe air. (2) The breathing usually goes on for some time after the animal has collapsed, but it may become reduced or stop too early and to prevent this it has been found useful to add some 4 to 5 per cent. CO_2 to the nitrogen. (3) No damage is done to any tissue so that the provisions of the Mosaic laws are strictly fulfilled.

Preliminary trials on rabbits by means of a nitrogen cylinder (less than 1 per cent. O_2) and a very simple mask with a rubber diaphragm showed that a complete narcosis could be obtained in less than one minute and could be repeated again and again on the same animal.

For experiments on a calf a mask was constructed with a fairly stout rubber membrane pierced by a hole which could be pushed up almost to the eyes of the animal. This mask was provided with inspiratory and expiratory valves allowing the animal to expire to the atmosphere and to take in nitrogen through a rubber tube and a rubber bag of sufficient size not to collapse even with the most violent inspiration. This worked well on young animals which would generally tumble over in collapse in less than one minute, but for full-grown cows the apparatus had to be enlarged beyond what we had expected, and even so there were occasional difficulties, because at a certain stage the violence of the movements could make the animal rather unmanageable. These movements and the occasional bellowing might also give the (unfounded) impression of suffering on the

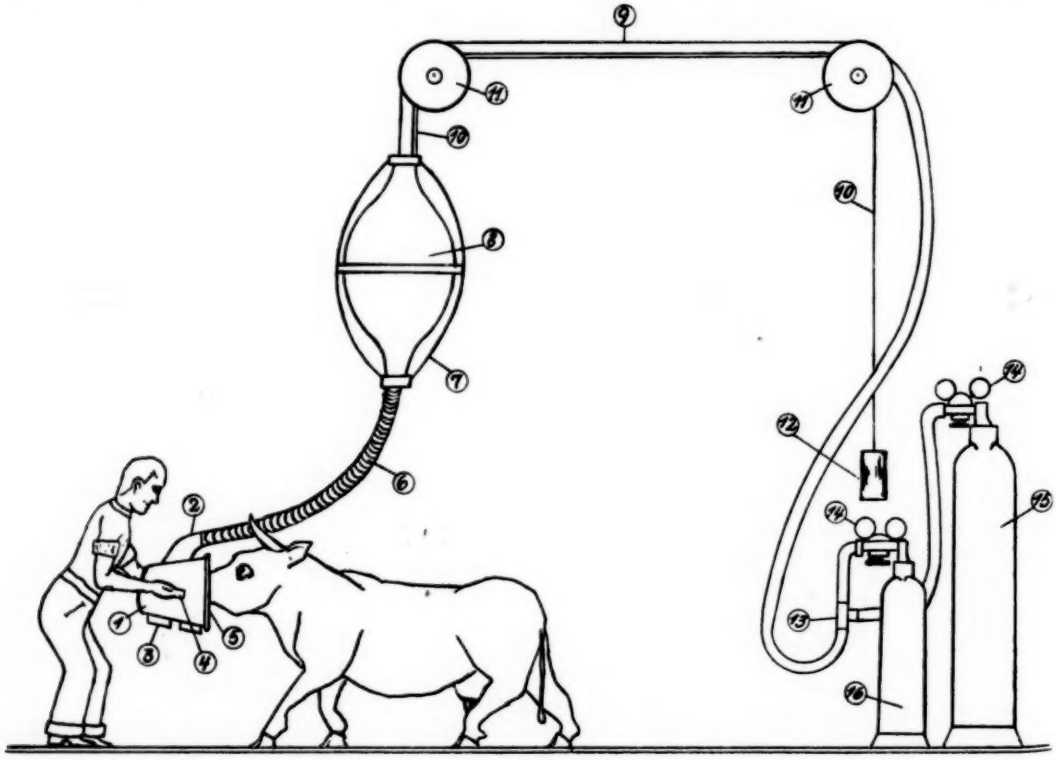

FIG. 1.

1. Narcotisation mask.
2. Connecting piece for inspiration valve.
3. Expiration valve.
4. Handle.
5. Rubber membrane.
6. Two-inch (50 mm.) flexible metal tubing.
7. Wire support for rubber bag.
8. Rubber bag of 35 to 40 litres.
9. One-inch (25 mm.) rubber tubing.
10. Steel wire.
11. Pulleys.
12. Counterpoise.
13. Metal T-piece tubing.
14. Reducing valve.
15. Cylinder containing 95 per cent. nitrogen and 5 per cent. carbon dioxide.
16. Cylinder containing nitrous oxide.

part of the animal. At this stage the Swedish author, V. Sahlstedt, intervened and proposed a mixed narcosis to be initiated by means of nitrous oxide and completed by nitrogen with 5 per cent. CO_2. Nitrous oxide produces no excitation and reduces sensitivity but does not directly inhibit reflexes.

As it turned out, nitrous oxide reduced considerably the motor activity in the first stages of the narcosis. The price of nitrous oxide is, however, much higher than that of nitrogen.

The procedure finally adapted was as follows: Nitrous oxide is provided in one cylinder of 10-litre capacity holding in all 4,000 litres at atmospheric pressure. Nitrogen with 5 per cent. CO_2 and less than 1 per cent. O_2 is supplied in two large cylinders each of 40-litre capacity and holding 6,000 litres at atmospheric pressure. A pressure gauge and reducing valve is mounted on each cylinder which will allow a maximum outflow of 150 to 250 litres per minute depending on the pressure. All three cylinders are connected up to the inhalation tube (9, Fig. 1). In this tube a rubber bag (8) of 35- to 40-litre capacity is interposed and the tubing (6) from the bag to the mask has an inside diameter of not less than two inches (50 mm.).

The mask is shown separately in Fig. 2. It is made from light metal and weighs about 5 kg. Wire netting with 28 mm. meshes inside makes it impossible for the animal to obstruct either its own respiratory passages or the valves. The valves are made from aluminium plates 0·25 mm. thick and held in position by weak springs. The connection between the rubber plate and the animal's head cannot be air-tight and it is important therefore that a positive pressure is always present within the mask. This pressure is provided by the rubber bag (8), Fig. 1.

Before a narcosis is undertaken the reducing valves are set to deliver the right amount of gas and the nitrous oxide main valve is opened fully so that the rubber bag will be filled just before putting on the mask. Nitrous oxide is given alone for about one-third of the total time necessary to cause the animal to collapse, that is, for one-quarter of a minute in the case of a calf and for one-half to three-quarters of a minute in the case of a full-grown animal.* Then the nitrogen-CO_2 is turned on first from one cylinder and then if necessary from both, while the nitrous oxide is shut off. Two cylinders are often necessary for large animals and will allow the nitrogen to be utilised down to 25 to 20 atmospheric pressures. The rubber bag on the inspiratory tubing must never be allowed even approximately to collapse even under the deepest inspiration taken by the animal. Any obstruction to the free inspiration causes unrest and usually leads to atmospheric air being sucked in which may considerably retard the attainment of complete anaesthesia and collapse. The complete narcotisation of a calf takes from one-half to one-and-a-quarter minutes and of a cow from two to three minutes.

This method has been in constant use at the public slaughterhouse in Stockholm since July; per month some 40 adult animals and about 75 calves have been narcotised and afterwards slaughtered according to the Mosaic ritual. One cow will require about 50 litres N_2O and 200 litres nitrogen at a total cost of three to four kronor (= about three shillings).

Mr. Jessen, mechanician to the Zoophysiological Laboratory, has taken part actively in the construction of the mask. The final adaptation to practical conditions in the slaughterhouse was undertaken by the engineer, Mr. Hesse, and by the firm "Københavns Metalstøberi og Mekanisk Værksted," who supply the apparatus. The expenses of this study were defrayed by the Jewish Congregation in Copenhagen.

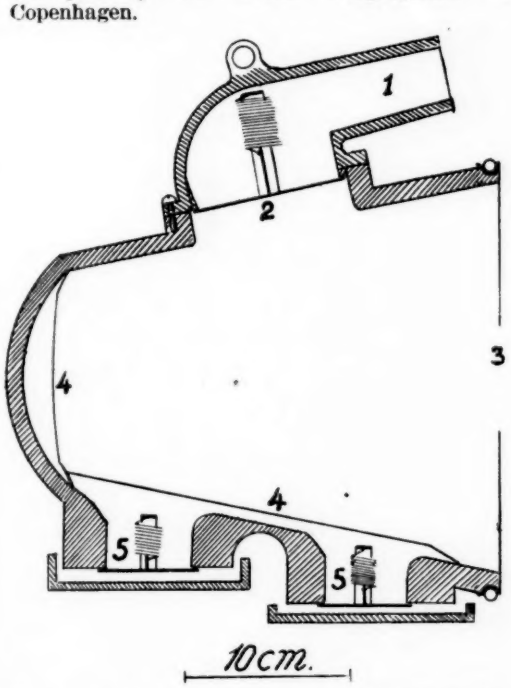

Fig. 2: Section through the narcotisation mask.

1. Tube for connecting with two-inch flexible metal tubing.
2. Inspiration valve (diameter 80 mm.).
3. Rubber plate 1 mm. thick with hole of 50 mm. diameter.
4. Wire netting with 28 mm. meshes.
5. Expiration valves (diameter 50 mm.).

*On calves a satisfactory narcosis can be regularly obtained with nitrogen alone.

Foal Mortality—Report for 1938*

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Brigg, Lincs.

In response to my appeal to my clients, 83 mares were forthcoming for experimental prophylactic treatment, which consisted, or should have consisted, of treatment with common salt solution some time before, and immediately before foaling. Good feeding and iodised minerals were advised and halibut liver oil was given—this is guaranteed to contain vitamin units A 1,000 and D 500. The second course of saline was not always administered owing to carelessness of the owners or unexpected foaling. Vitamin E, as advised by Professor Wm. C. Miller, was not given as there appeared to be difficulty in procuring it in a convenient form. Of the 83 foals, 61 lived; 22 died from causes as follows: abortion, 4; dystokia, 5; traumatism, 3; retained meconium causing toxaemia and in some cases joint-ill too, 8; dam—no milk, 1; weakly at birth and dying soon afterwards, 1.

So far as retained meconium is concerned it cannot be claimed that satisfactory results were obtained from the above treatment, though the condition of the mares was much improved, for on one farm all the five mares were given every chance, were in excellent condition, fit, well and regularly worked, yet all five foals had to be treated for retention of meconium, three successfully. No less than 21 altogether of the 83 foals had to have similar attention, 13 surviving and eight dying. Twelve cases were treated prophylactically immediately after birth and all lived. On the other hand, eleven cases were met with in foals of untreated mares, eight surviving. A total of 32 cases of retention with 21 recoveries.

In the case of the treated mares' foals the high incidence of mortality appears to have been due to (*a*) a false sense of security on the part of the owners; (*b*) delay in calling for assistance; and (*c*) the fact that this year in some instances the treatment did not prove as efficient as formerly. The treatment was: Sod. bicarb. ℥i, Dianimol ℥ii, aqua ℥viii and paraffinum liquidum ℥viii, per stomach tube. Evacuation of meconium appeared to be quite satisfactory yet death followed in some cases probably because intestinal secretions were not sufficiently stimulated—moreover, intestinal disinfection by medicinal agents can only be transitory. Castor oil was added in later cases but there still lingers a doubt; does liquid paraffin mask the actions of the other agents used?

In all cases of toxaemia and joint-ill there was a history of retained meconium, the constipation lasting in one instance a fortnight and in another three days before death ensued; these were treated by their owners with castor oil and linseed oil respectively.

There were nine cases of pervious urachus with suppuration and necrosis, but all lived following once curetting and treating with an antiseptic. It is, however, true that in some of the fatal cases following retention the urachus was also affected.

Five of the treated mares—their foals were also attended to curatively or prophylactically—which have been successful this year had previously lost one, one, one, two and three foals respectively from joint-ill. In contrast there is a known case of a mare which lost her 1937 foal from joint-ill but has been successful this season without any treatment whatever.

The findings of the year's work are:—

1. Ante-natal treatment of the mares has not proved successful.

2. Joint-ill originates in the alimentary canal, not through navel infection, and follows retention of meconium.

3. The cause of retention is not known.

4. Earliest possible treatment of the foal on the lines indicated above appears to be essential—delay is highly dangerous. The treatment given is subject to modification but in what respect does not at the moment appear clear.

It is hoped this report will provoke much thought and a useful discussion, for the foal breeder suffers severe losses and so is in dire need of help. What does every live foal cost the community? For example, while not at the moment within our purview, it is interesting to relate that a Shire stallion, travelling in this district recently, left 14 foals out of 110 mares. Then the foals were liable to all the ills.

Discussion

Professor W. C. Miller, opening the discussion, said: I should like to thank you, just in a word, for having invited me to contribute to the discussion on "Foal Mortality," introduced by Mr. Lang.

I find it no easy task to do so, because I think we must all admit that we have a great deal still to learn regarding the whole subject of horse breeding and rearing, and *adequate facilities* for studying at first hand diseases and irregularities of reproduction, and the troubles that affect young foals, are not yet available in Britain.

You will remember that Mr. Lang last year gave you some figures relating to foal mortality,

*Contributed to the Lincolnshire and District Division, N.V.M.A., at Lincoln, October 20th, 1938.

which had been obtained from insurance companies. I have made an attempt to obtain a rather wider series of figures, covering a longer period of time, so that we might have an opportunity to view the problem in better perspective and know whether the general rate of foal mortality, over a large part of the country, was increasing, stationary, or decreasing, and whether there were areas which were worse or better than others. I ought to say at once that, for technical reasons and because of the fact that much of the information is of a secret nature, I have been unable to get a really comprehensive picture. I would like to give you the figures first. They are as follows:—

MAIDEN MARES

	No. of Insured	No. of deaths*	Percentage
1921	588	113	19·2
1922	413	82	19·85
1923	266	61	23·0
Total for three years	1,267	256	20·2

ALL OTHERS

	No. of Insured	No. of deaths*	Percentage
1921	1,675	278	16·6
1922	1,146	248	23·4
1923	1,143	146	12·8
Total for three years	3,964	672	17·0

Grouping the mares together for this three-year period, there were 5,231 mares insured, of which 928, or 17·7 per cent., lost their foals.

Figures are not available for the intervening years until 1932. You will remember Mr. Lang (1938) gave figures for a three-year period in his paper to you last October. I can add to these as follows:—

	No. of Mares Insured	No. of deaths*	Per-centage
1932	—	—	22·0
1933	810	168	20·7
1934	1,084	221	20·4
1935	1,317	290	22·0
1936	1,497	353	23·5
Total for four years, 1933–36	4,708	1,032	21·8
Total for three years, 1934–36	3,898	864	22·16

*In each case, the deaths are of foals up to one month old.

I think that the three-year period 1921-23 can reasonably be compared with the three-year period 1934-36. The figures were all furnished from the same source, and are at least comparable with each other for a particular company. If this be accepted it seems logical to deduce that the rate of foal mortality has increased from an average of 17·7 per cent. in 1921-23, up to a figure of 22·16 per cent. for 1934-36, which is an increase of almost 4½ per cent. It may be of some significance that the highest figure for the series is that for the last year for which figures are available, *viz.*, 23·5 per cent. for 1936. I agree that among live-stock, no less than among wild animals, there are fluctuations of population numbers, and of births and deaths, which appear to follow a definite law in which an alternation of "peak" and "trough" numbers occur. It may be that some such fluctuation of foal mortality has been going on for some time and that this rise of 4½ per cent. during the 15 years under review will be followed by a similar decline during the next 15 years, or some other longer period of time.

Quite apart from this, however, the significant fact brought out by your essayist last year and somewhat amplified by the figures I have been able to give you, is that out of every five foals born, one will die during the first 30 days of its life (the period covered by most of the insurances).

I would hazard the suggestion that if we had a regular mortality of about 20 per cent. among all lambs and calves during their first month of life, it would be a worrying thing indeed. In this connection, it may be suggested that mares which are insured are not a fair sample of the population. It might be argued that a farmer will only insure the foal of a mare about which he has some doubt: such as, the old mare foaling for the first time; the mare which has already lost one or more foals, or the mare which has been difficult to get into foal. This might mean that the insured mares are not a truly representative sample of the female equine breeding population, and that the losses among them are heavier than the normal average losses. While this is undoubtedly true for a certain proportion of farmers and may apply to some districts, I feel that amongst almost 10,000 mares (figures for which were given above) it will not materially alter the final conclusion that about 20 per cent. of foals are lost. The actual grand total figures are: out of 9,939 mares insured in the two periods totalling seven years, 1,960 foals were lost which is equal to a percentage of 19·72 per cent.

The next thing to which I should like to draw your attention is the fact that we have no means of determining what individual factors are responsible for causing this death-rate, other

than a tabulation of individual experiences from veterinary practitioners such as those of your essayist. I would like to pay a warm tribute to his energy and initiative in keeping his records and making them available for others.

For the moment, I would like to consider Mr. Lang's figures briefly. Retained meconium and toxaemia (with or without joint-ill) caused a loss of eight out of 22 foals; dystokia resulted in five deaths, and abortion in four deaths. I think we can fairly neglect in this discussion deaths from dystokia (five), from trauma (three), lack of milk in the dam (one), a total of nine. Some one or two cases of abortion may well be of an accidental nature, and can also be disregarded. Perhaps Mr. Lang could throw some light on this aspect in his reply.

This means that probably half the deaths (in Mr. Lang's figures eleven out of 22) were due to conditions which might be amenable to preventive treatment. There is a further point worth noting. Nine cases of pervious urachus had to be treated during the year. Now I suggest to you that neither retention of meconium, pervious urachus, nor the birth of weakly foals are normal conditions. Some will hold that pervious urachus is an inherited condition, but there is no real evidence in favour of this view. It is more probably a developmental abnormality. Either the tissues of the urachus fail to effect a proper sealing of the opening from lack of necessary stimulus (whether this be nervous or nutritional), or the foal is born too soon—before the natural shrinkage and closure processes have had time to operate. A certain number of cases also occur from repeated straining occurring when meconium is retained, and causing the soft tissues of the urachus to break down. I would like to ask Mr. Lang whether he has any records of the duration of pregnancy in these nine cases of pervious urachus?

The whole question of retention of meconium is an exceedingly important one, and is one the physiology (or pathology) of which is not fully understood. We have all, doubtless, seen foals which for two, three, or even four days passed nothing except perhaps one or two small dense balls of blackish-coloured meconium, but which after vigorous treatment recovered. We have also seen the same kind of case, clinically indistinguishable from the above, which developed a septicaemic or toxaemic condition and ended fatally. I am, myself, in full agreement with Mr. Lang that the sooner measures are adopted to stimulate bowel movement in the new-born foal, the better the result is likely to be.

In this connection, I note in passing that Mr. Lang does not apparently employ enemata. Personally, I have considerable faith in a hot or at least very warm (about 115° F.) copious enema of soapy water followed immediately by equal parts of glycerine and water. I admit that from a mechanical point of view one cannot hope to influence meconium situated anywhere but in the rectum and perhaps a small part of the small colon, but I think the stimulus of the hot water, and perhaps also of the glycerine, has a reflex effect on the gut wall much farther forward. I should like to ask Mr. Lang whether he has ever used any of the alkaloidal intestinal stimulants, such as eserine (*e.g.*, ¼ grain) (subcutaneously), or acetylcholine (about 1½ grains, intramuscularly) (arecoline might well be too severe). It occurs to me that they might be well worth a trial in doses appropriate for the newly born foal. In pre-war years, in the heavy-horse breeding districts, I well remember that half-a-pound of salt butter given by the mouth in hot mare's milk, was regarded as the best method of inducing evacuation of meconium. (Incidentally, it was a good method of ruining a suit of clothes!) I think a few of the older men use it still.

Personally, I must confess to a difficulty in following the whole of Mr. Lang's reasoning when he concludes that "joint-ill *originates* in the alimentary canal, not through navel infection, and *follows* the retention of meconium." Meconium is, of course, principally tissue débris, secretions, etc., which accumulate in the intestinal system of the foetus before birth. Until the act of parturition commences, it is normally sterile. It may be that the sucking movements of the jaws which occur during the act of foaling are the first occasion on which organisms can gain entrance to the foal's alimentary canal and so infect this hitherto sterile culture medium—the meconium. Or it may be that the intake of organisms—whatever they are—occurs at the time of the first suck. In any case, infection cannot very well take place before foaling except by one means, *viz.*, by passing the so-called "barrier" of the maternal and foetal placentae. It is well known that foals may die from a septicaemic condition, in which visible abscesses are present, within a few hours of birth. Though these may not perhaps be quite typical "joint-ill" cases, I think he would be a courageous man who would undertake to differentiate them from the more typical joint-ill cases. We are, therefore, compelled to conclude that the mare herself is primarily responsible for infecting her own foal *in utero*, by failing to protect it from such organisms as she carries in her blood stream. Presumably, when a heavy infection has reached the foetus, septicaemia and death occur very shortly after birth. If a lighter infection occurs, death may follow some days or even weeks later. If this be so, it is difficult to reconcile the suggestion made above that joint-ill *follows* retention of meconium. It could be argued that retention of meconium resulted from a primary *in utero* foetal infection, and that it might be better to look upon it as an index of an earlier

infection rather than as the contributory cause of the infection. There is, of course, one other possibility, *viz.*, that we have actually two different conditions: the first, in which death occurs within a few hours of birth, being an intra-uterine infection; and the second, where death does not take place until some days later, and generally showing the more typical joint lesions, being an infection contracted at or after foaling from rapid multiplication of organisms which invade the retained meconial masses first, and set up a septicaemic condition subsequently. Should this be so, I can agree with the suggestion that retained meconium is a contributory cause of joint-ill, but we must agree to differentiate between the two types—early deaths and late deaths. It would be interesting to see a classification of, say, 100 [or better 500] deaths of foals from joint-ill, arranged as a graph to show whether there were critical times of death. If we could state definitely that a large proportion of foals die from a septicaemic condition within the first twelve hours of life, and another large proportion die around four to seven days after birth, with definitely smaller numbers outside these times, it might help to determine whether we have two distinct conditions to deal with or not. You will realise, of course, that much of this is surmise. We badly need further information from clinicians and bacteriologists alike.

With reference to the ante-natal treatment given by Mr. Lang to his mares, he himself has concluded that ante-natal treatment has not proved successful, but he mentions that for one or another reason it was not always possible to carry out the second administration. This is a pity because, personally, I think that the second treatment given a day or two before foaling would be more likely to have some beneficial effect on the circulation of the dam and, therefore, perhaps also upon the circulation of the foal, than would treatment carried out some considerable time before foaling. To my mind, Mr. Lang might almost exclude from his group of 83 mares, all those which did not receive the second saline administration. I hope he will not reach any final conclusion from this season's work but will arrange to conduct a similar trial again next year. I would even urge him to do so. In this I think I will have the majority of members with me. Even if no spectacular results should be obtained, another series of figures will have been collected. Perhaps it is not too much to hope that his work may stimulate others to keep records in their own practices. It seems to me that in the meantime, practitioners themselves in horse-breeding districts could not only provide a large amount of valuable information, but might carry out a very useful clinical investigation, if they would adopt a systematic scheme for classifying the causes of deaths among foals, determine which condition is the commonest cause, and subsequently attempt to correlate the nutritive and environmental conditions, ages, breeding histories, etc., of the mares, in an effort to throw more light upon what is admittedly a very confused picture. I can assure them that additions to our knowledge which they could furnish in this way would be very much appreciated. I can further assure them that they could depend upon those of us who have to work in institutions to give them every help possible.

Finally, I should like to compliment Mr. Lang upon his enthusiasm, energy and courage in having followed up his paper of last year by another this year. He deserves our best thanks.

Mr. R. Hudson congratulated Mr. Lang and thanked him for his great effort to solve the problem of foal mortality. For a hard-worked practitioner to get a response of 83 mares, to treat them and numerous foals during a busy time, made him feel ashamed that he did not do more to help to solve some problems. A failure, if it were a failure, was nothing in such a case: Mr. Lang might feel some disappointment, but he was sure much good would come out of his great effort.

A livestock insurance superintendent once informed him that Lincolnshire was the worst of all counties for insurance, and he thought the county must be keeping up its reputation. The wholesale troubles in foal rearing made him think that they must have a lot to learn in their general management.

Good feeding and iodised minerals were advised: in his view, Mr. Lang would have done better to have advised starvation rations—the mares were too near the corn bin.

The second injection of saline was missed in some cases. This, he thought, was unfortunate—though he realised the difficulty—for the action of sodium chloride as a purgative and diuretic was only transitory, and it was at the critical time of foaling that its action was most needed.

He did not know what action Mr. Lang expected to obtain from vitamin E, concerned as it is with sterility. He should have thought that, having overcome it and ensured a full-time foal its work was finished.

Twenty-one out of 83 foals had to be treated for meconium retention, five of which were on one farm. Apart from the statement that joint-ill results from retention, did this not point to unsatisfactory diet? To his mind it did.

Twelve foals treated at birth all lived; eleven foals from untreated mares were treated and eight lived. It would appear that treatment had influenced the result here, though the result might have been influenced by Mr. Lang attending the twelve foals at birth as arranged, and attending the eleven when the owner thought it necessary.

Did liquid paraffin mask the action of the other drugs? It might do so, and in any case its use appeared to him to be unnecessary, acting as it did only as a lubricant. He did not see how it could lubricate meconium where it was most needed—in the lower bowel.

If there was anything in the meconium theory of the cause, then remove it by rectal injections and saline purgatives as quickly as possible. Mr. Lang found meconium retention in all joint-evil cases and toxaemias. He (Mr. Hudson) had often stated that a foal could become infected and die within four hours of birth. Infection would lead to meconium retention and

if retention would assist the disease, but he could not accept the view that the retention of a natural product for a few hours would induce the disease—other things being normal. Why did meconium accumulations last a fortnight and three days before causing death. Could they not be removed? Were they to assume that meconium, a germ-free product up to birth, might at once become infected and breed the germs of joint-evil and toxaemia? He had a notion that it would be difficult to grow organisms in meconium: Professor Dalling might have a try.

There was infection of the urachus in some fatal cases and in some that lived. The same organism did not always infect, and some might pass along it or the umbilical vein without outward manifestations.

Five foals from joint-evil breeding mares was a good result of treatment.

Concerning Mr. Lang's findings—No. 1: The treatment adopted was not sufficient to ensure that a purgative action was transmitted to the foal; No. 2: One could talk for a week about this and not get further forward. The mere presence of meconium was not proof of alimentary infection and there had been plenty of evidence of infection along the umbilical vein; No. 3: Retention of meconium had for years been known to be due to the mare being on a constipating diet; No. 4: The treatment of the foal might be necessary. Perhaps it would be more successful than inducing owners to treat mares by proper feeding and physicking gross ones.

His own experiences this summer were not extensive. Two foals that would not suck received tube injections and sodium chloride and magnesium sulphate and both took to the teat within twelve hours. One lived and one developed joint-evil and died about two months after. One mare, a breeder of two joint-evil foals, had a six-dram dose of aloes a few hours before foaling and reared her foal successfully. The very early summer was favourable to a low mortality.

Mr. O. V. Gunning congratulated Mr. Lang on his paper and Professor Miller on his opening remarks. He thought it should be realised that joint-evil was not a separate disease, but a septicaemia caused through a number of different organisms, each causing a different train of symptoms.

In his experience, infected premises were one of the greatest sources of infection; once a case of joint-evil occurred, you were nearly sure to get a recurrence. He recalled a client who insisted on having his mares foal in paddocks near the house; the infection became so great that the owner simply could not rear a foal. He (the speaker) also had a client who had trouble each year with his foals. He moved to another farm where no breeding had been carried out for some years, and the trouble stopped completely. There was, however, always the exception that proved the rule, and certain foals, often small undeveloped ones, appeared to have some natural immunity.

Through the collaboration of Professor Craig, several blood samples had been tested from mares that each year gave birth to foals which developed joint-ill, and from the results there were strong suspicions that these mares were carrier mares. Practically every foal in his district had bullet-like faeces at birth. He viewed this as an abnormal condition, but was at a loss to know the cause. He did not, however, often get the serious trouble from it referred to by Mr. Lang. He was a great believer in enemata, and always gave them by gravitation with an irrigating can. In the case of a foal it was possible to get the fluid a considerable distance up the bowel.

With regard to pervious urachus, he was of the opinion that it was a symptom of infection, and always viewed the condition seriously.

Regarding the questions raised by Professor Miller, in the case of his foal mortality statistics, it would be interesting to know the weather conditions in the various years mentioned, as in his experience weather had a considerable influence on the incidence of the disease. The particular district would also influence the mortality rate. Districts where much breeding was done had more infection than districts where only a few foals were born. Referring to Professor Miller's point that farmers insured only the doubtful mares, he would point out that most insurance companies would not insure one mare unless they insured all, and in his practice, insurance of all mares was very general.

Lastly, with regard to prevention, for several years he had been inoculating a large proportion of the foals dropped, as soon after birth as possible, with a large dose of polyvalent curative joint-ill serum, together with vaccine, with the most satisfactory results.

He wished to thank the members of the Lincolnshire Division for the invitation to be present that day.

Mr. G. A. Moore said that joint-ill was a great curse in the studs of Ireland, and by joint-ill he meant any condition in a foal up to three weeks that involved a high temperature with or without lesions in the joints. There was great difference of opinion with reference to tying of the cord; he thought the cord should be removed as close to the body as possible by tearing, scraping or cutting with an écraseur and dressing the stump with collodion and iodine or tar. He thought the organisms often entered the blood stream via the decomposing navel cord.

Inoculation of foals at birth with anti-streptococcus serum worked well. An autogenous vaccine made from the foals one year and inoculated into the mares the following year was also efficacious. Injection of blood from the dam into the foal subcutaneously was commonly practised in Ireland.

Mr. T. Hicks congratulated Mr. Lang and Professor Miller, and said that he had had good results with anti-streptococcal vaccine (Parke, Davis & Co.). He gave the mare 5 c.c. one month before foaling and again 48 hours before the expected foaling; he also injected the foal with 2½ c.c. immediately after birth. He had had only one case that developed joint-ill after this treatment, but a double dose of vaccine had cured it. The foal that developed joint-ill within three days generally died. He thought retention of urine was fairly common and had saved many foals by the use of a catheter; for retention of meconium he used glycerine and warm water enemata. The vaccine was very useful for the treatment of cases that developed in the older foal.

Mr. F. W. L. Gooch said that he would like to ask what was the mortality rate with the different breeds. He agreed that the weather and the season made a great difference to the mortality rate, as also did the owner of the stud. Early aperient treatment of foals was essential and 1 to 2 oz. of castor oil should always be given. His experience was that infection lay

entirely with the dam; he believed in tying up the cord one inch from the body. He did not think joint-ill was a good name, as in many cases the joints were not affected. Retention of urine in many was due to the fact that the foal could not draw the penis. He had used vaccine without much success.

Mr. R. Swaby spoke to having seen several cases of acute meningitis in foals which simply knocked themselves about and died in three or four hours. He had had no success with sera or vaccines.

Mr. G. Eaton said he had had many disappointments with sera and vaccines. He had had one case of meningitis in a thoroughbred foal which, immediately it could stand, had circled continuously to the right, but with chloral *per rectum* it recovered.

Mr. W. Gibson observed that retention of meconium was very common in foals born early in the year and comparatively rare in those born in May; he attributed this to the fact that the colostrum in the dam's milk was greatly improved by her diet of young, fresh grass. The handle of a tablespoon was a very useful instrument for the removal of those hard bullet-like lumps of faeces that could not be removed by enemata. He did not regard retention of meconium as a symptom of joint-ill, but rather as a predisposing cause.

The Replies

Mr. Lang, replying, said that he thought it was the best discussion they had had at any meeting for years and that he regarded it as a great reward for having introduced the subject. Professor Miller was asking them all to make more careful reports, which would show more clearly what was happening. Team work was essential.

He did not know the periods of pregnancy in the cases of pervious urachus. He always used enemata of salt and water (1 oz. to the gallon) by gravitation. The second dose of saline before foaling should have been beneficial, but it was disappointing.

Mr. Lang regretted the absence of Professor Dalling and expressed the hope that he would see a copy of the discussion and reply to it in an addendum in the *Veterinary Record*.*

He had tried blood transfusions years ago but without any good results. He was very interested in Mr. Hicks's remarks about the use of vaccine, but had he kept any figures or history of the mares? He had seen no cases of meningitis or of urine retention.

Professor Miller said that the discussion had centred almost entirely on joint-ill and not foal mortality; this showed that the biggest loss must be through joint-ill. Mr. Gooch had asked about the distribution through the breeds, but the insurance company would not separate the figures; he thought most of them were for heavy mares.

. . . . . .

Addendum by Professor Dalling*

Unfortunately I could not be present to hear and take part in the discussion on Mr. Lang's paper. I therefore welcome the opportunity of adding a note, and specially of paying tribute to his effort in keeping the interest of the veterinary profession stimulated on the important subject of foal mortality. We all know how keenly interested is Mr. Lang in this work and the paper he has presented this year is further evidence of his careful observations. If more of us could follow up, year by year, the success and failures we have in the practical application of our theories and ideas on subjects in which we take more than a passing interest, I feel sure that much of a valuable nature would accrue therefrom.

Mortality in foals has also interested me for many years, though it has not been possible for me to carry out much work on the subject. Nearly 20 years ago, the late Professor Gaiger and I published a short paper in which we described the bacterial findings in the tissues of several foals which were sent to us in Glasgow. We formed the opinion at that time that coliform organisms were responsible for the deaths of these animals and referred to the rôle that such organisms appeared to play in the causation of acute illness in the different species of very young animals. I think I should add here that at that time we were of opinion that coliform organisms were responsible for the occurrence of lamb dysentery—an opinion which further investigations into the disease showed was evidently incorrect.

Joint-ill is the name apparently applied to illness in foals within a few days or weeks of their birth and in many cases would appear to cover illness in which the joints are not involved. To my mind, the bulk of the disease in young foals can be divided into two main groups—those occurring soon after birth and those in which the symptoms do not appear for some few days or even some weeks later. We must agree, I think, that bacterial infection of some kind plays the important part in both cases, though need not be the essential cause in the earliest stages of the disease. There is a feeling that in the case of the weakly foal which does not survive long after birth and from whose tissues pathogenic organisms can be recovered, those organisms may have infected the animal *in utero* and that at birth they multiplied in the tissues to such an extent that death occurred. I feel that we need much more evidence before accepting this theory, for I have a great respect for the "barrier" between the dam and the foetus, specially since we carried out our investigations into lamb dysentery. It seems to me rather that the dam fails to produce in the foetus that necessary "resistance" found in healthy animals, so that at birth the foal cannot of itself prevent the invasion of organisms which give rise to the symptoms of illness and death. Why this should occur in certain cases and not in others is probably to a large extent unknown to-day but it is significant that the same dam may for a number of years continue to produce foals which die from "joint-ill." I feel that this problem must be studied not so much by the pathologist but more by the expert in animal husbandry. Nutrition, hereditary influences, etc., may enter largely into the story, and it may concern the sire as well as the dam. It is true, of course, that the same pathogenic micro-organisms may be found in the foals of the same dam from year to year and this has given rise to the belief that the true cause of the trouble is this specific infection. It has also been thought that the dam may be a "carrier" of the infecting organism and if infection does not take place *in utero* it occurs almost at once after birth. So much did this theory prevail that immunising of foals by the injection of vaccines into the dams has been largely practised in some districts. Micro-organisms isolated from the dead foal have been used for the preparation of a vaccine for use in subsequent years. We know now, of

course, that the use of such a vaccine will not produce an immunity in the foal till after birth when it has had the opportunity of partaking of the colostrum from the vaccinated dam. If the vaccine possessed antigenic properties, the colostrum of the injected dam would probably contain a high concentration of specific antibodies.

The source of the infection causing the illness is of considerable importance. While it cannot be denied that in some instances there may be some evidence of pre-natal infection and that in other cases infection has occurred via the navel, I feel with Mr. Lang that especially in deaths soon after birth, the infection originates in the alimentary tract of the foal. The fact that death of the foal may apparently be associated with an invasion of the tissues with organisms commonly found in the intestine and not necessarily with those of generally acknowledged high pathogenicity, raises the question of the conditions in the alimentary tract which may permit of the penetration of such organisms. Mr. Lang believes and has some evidence that retained meconium is a condition which often accompanies other symptoms of illness in foals and that the removal of that substance is often followed by the recovery of the patient. There seems little doubt that the retention of the meconium would tend to encourage the multiplication of organisms in the intestine, but it seems to me that we have as yet no evidence concerning whether the retention of the meconium, as so often observed by Mr. Lang, is a primary or a secondary condition in the aetiology of these illnesses in foals. Does retention of the meconium arise from some common aetiological cause of the general condition or is it purely secondary to the state of the intestine consequent upon the effect of micro-organismal activity? These are questions which cannot be adequately answered till we know more of the actual primary cause of the ilnesses in foals soon after birth.

There are, of course, specific causes for so-called joint-ill in foals, but I do not think that these apply to the cases with which Mr. Lang has had to deal.

A wireless appeal for funds is to be broadcast from all National stations at 8.45 p.m. on Sunday, February 5th, on behalf of UFAW (The Universities Federation for Animal Welfare). This organisation, which has a large number of veterinary and other scientific members, is one which strongly recommends itself to the profession by its practical and well-informed outlook. It is hoped that veterinarians will call attention to the broadcast, which will take the form of a dialogue between Fougasse, the Art Editor of *Punch*, and the Hon. Harold Nicolson, M.P. The President of UFAW is Sir Frederick Hobday, who was President of ULAWS (The University of London Animal Welfare Society) until ULAWS was expanded into UFAW.

The Veterinary Record

February 4th, 1939.

A Change of Ministers

AMONG the changes in the Cabinet announced over the week-end is the appointment of Sir Reginald Dorman-Smith to succeed as Minister of Agriculture and Fisheries, Mr. W. S. Morrison, who becomes Chancellor of the Duchy of Lancaster.

The profession will feel some regret at this loss of contact with Mr. Morrison, for his period of office was one of great moment to us, witnessing as it did the passing of the Agriculture Act of 1937, the establishment of the centralised veterinary service, and the publication of the Report of the Committee on Veterinary Education. The members of the N.V.M.A., in particular, will recall with appreciation the gesture of goodwill made by Mr. Morrison, when, in 1937, he addressed the Association at its Annual Congress—the first Minister of the Crown to do so. Subsequently he received the Association's representatives in conference, and this readiness to meet them in person contributed much towards the establishment of the good relations which now exist between the Ministry and the profession.

We may look forward with confidence to the continuance of this goodwill under the new Minister who, as a leading figure in agriculture, brings to his task an intimate knowledge of the problems and difficulties which at present beset this basic industry. We hope in our next issue to give a fuller appreciation of Sir Reginald Dorman-Smith.

Particular interest attaches to the awards in the Hertfordshire Milk Recording Society's competition this year in that the A1 Dairy Cup has been won by the first herd on the Attested Roll. This is no small feat for a Jersey herd in competition with all other breeds.

The winning herd is that of Mr. E. Aron, Hillside Farms, Hunton Bridge, King's Langley.

CLINICAL COMMUNICATION

Shoulder Lameness

LIEUT.-COL. J. R. HODGKINS, F.R.C.V.S.,
CAIRO

"We grant we have signs to direct us to the shoulder as the seat of lameness, but are we acquainted with which of these signs we are to take for rupture or lesion of muscle, which for sprain or lesion of the bursal apparatus of the Flexor Brachii, and which for inflammation or ulceration of the shoulder joint itself?

"Because this is the distinctive point we desire to arrive at, and if we cannot reach it, and satisfactorily reach it, where do we find our diagnosis?

"So far as shoulder lamenesses are to be discriminated one from another, in point of fact, 'nowhere.'

"All our judgment merges in the case being a shoulder lameness, and having said that, we have, in truth, said as much as we really know for certain about the matter."

Veterinarians with experience of horse practice will recognise how correct Mr. William Percivall was in his views on the difficulty of precise diagnosis of the cause of shoulder lameness. One is diffident in asserting that one's patients are suffering from this or that lesion in the region of the shoulder.

The accompanying photographs are of two Gharry horses working on the slippery streets of Cairo. They came to hospital showing identical symptoms—those of paralysis of the supra-scapular nerve as described in current veterinary literature.

One of the animals has been discharged, apparently quite cured, the other is as lame as an animal can be and shows no signs of ultimate recovery.

Their histories are as follows:—

CASE 1: *Subject.*—Grey mare; age 17. Condition on admission, "poor." Date of admission, August 17th, 1938.

History.—Quite unreliable, but the possibility is that she had slipped whilst working in double harness on the streets. The lameness was not recent and the shoulder showed signs of treatment.

Treatment.—Massage with passive movements and later walking exercise. Later subcutaneous injections of veratrine were tried. All to no purpose. The mare remains as lame as ever (December, 1938). In Fig. 1 this is the animal held by the man's right hand. In the individual picture (Fig. 2) the animal's head is nearest the observer.

FIG. 1

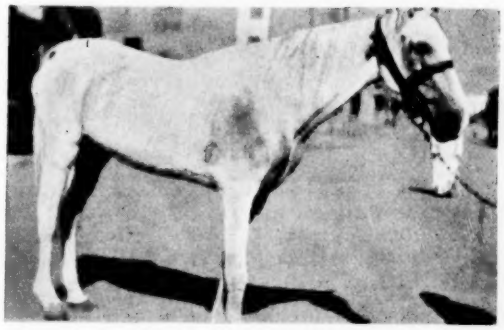

FIG. 2

CASE 2: *Subject.*—Grey "entire"; age, 11 years. Condition on admission, "poor." Date of admission, November 4th, 1938.

History.—The injury had occurred the previous day. The animal was very lame and the condition painful.

Treatment.—Hot packs of magnesium sulphate (the salt in a bag) several times daily. Later, massage over oiled paper. Passive movements. On December 6th injection of veratrine (one grain); December 12th, injection of veratrine (one grain); December 19th, ordered trotting exercise. December 24th, progress favourable; December 29th, issued for light duty—quite free from lameness. From the date of the second injection, he rapidly improved. the individual picture (Fig. 3) *(over-leaf)* this animal's head is furthest from the observer and shows the atrophy of muscle and pointing of the shoulder markedly.

Unfortunately the writer is unable to convince the owner of Case 1 that his animal is unlikely to make an economic recovery; therefore he cannot describe the *post-mortem*

Fig. 3

findings, but in time the owner may make up his mind.

Discussion.—Was it the difference between early and late treatment or is there some bone lesion in the mare—that one is issued and one remains? Unfortunately there is no apparatus in Cairo suitable for radiography of this anatomical area in the horse.

So we come back to the final paragraph of the extract at the head of this article. And again he writes: "Nothing but steady observation and faithful and frequent report can clear up these matters."

Fifty wild ponies were killed by motor cars, or so badly injured that they had to be destroyed, on the New Forest roads last year, it was reported at a recent meeting of Verderers of the New Forest at Lyndhurst, Hampshire.

* * * * *

"The end of the sheep colouring dispute which resulted in Border Leicester breeders boycotting last year's Highland Show at Dumfries is now in sight," observes the *Farmers' Weekly*. "At a meeting in Edinburgh the Council of the Border Leicester Society agreed to accept the invitation to discuss with the Highland Society the experiment proposed to be introduced enabling sheep exhibits at Edinburgh to be coloured with a light bloom dip which is capable of being washed off or which will fade naturally in the course of a few weeks."

ABSTRACTS

[Diseases of the Young Fox. (Trans. title.) Schoop, Gerhard. Bekämpfung der Aufzüchtkrankheiten. Eighth Meeting. 1936. pp. 267-280.]

In this article it is pointed out that in Germany at least 25 per cent. of foxes bred in captivity die within the first six months of life and the author analyses the causes, referring to some considerable extent to his own observations. These losses are in addition to the so-called "normal" losses and vary considerably from ranch to ranch. For some successive years losses may be low and the ranch is run at a profit, but after a time losses almost invariably increase up to from 30 to 75 per cent. with corresponding loss of income to the fox breeder. There is evidence that such losses appear to be on the increase and in some areas the ranches become "fox sour."

The author divides the period during which losses occur into two—the first five days and from one to six months.

(*A*) First Five Days.—If the cubs survive the first five days of life, they usually live till at least a month old. During this time they are in the whelping nests and only receive mother's milk as food. The causes of death during this early period are usually referable to the vixens and are divided as follows:—

1. *Unsatisfactory Feeding of the Vixen during Pregnancy.*—There is a popular belief that better mating results follow the use of a low diet and, further, that in order to ensure that the whelps will not develop to too large a size *in utero*, a low diet should continue to be fed during pregnancy. The author points out, however, that a diet deficient in protein often leads to a low fertility rate and if continued throughout pregnancy may result in losses among the newly-born whelps, though they appear to be fully developed. (Scheunert showed this to be the case with rats and the author found similar results with mice.) The substitution of vegetable proteins, *e.g.*, various cereals and potatoes, together with bits of bone, for animal protein in the diet of pregnant vixens is often followed by early losses among the progeny. Attention is is drawn to the fact that foxes are essentially carnivores and that their diet in their natural state is entirely animal protein; any vegetable matter they receive is probably contained in the alimentary canal of their prey, *e.g.*, berries, etc. It is stated that the flesh content of the diet of breeding foxes should never be less than 75 per cent. and that this should not be made up of bits of bone only.

2. *Unsatisfactory Warmth of Whelps by the Vixens.*—Silver foxes are born usually in

February to April when the temperature may be low. A comparison is made between the whelping nests used by foxes in the wild state and those in ranches. In the former cases the nest is in the ground, often several feet below the surface where the temperature does not vary more than a few degrees. Under ranch conditions the whelping boxes and nests are usually made of wood and variation in temperature (depending on the weather) may be as much as 22°. The young whelps must, therefore, depend for their warmth on their mother. The act of whelping may last some little time, during which the vixen cannot give much attention to the whelps already born, hence they may die from exposure to cold. The author suggests that the whelping boxes should contain supplies of manure, leaves, straw, etc., so that the vixens can make the necessary nests and better, that whelping boxes should be lined with two layers of wood as is done in Germany with huts for young pigs.

3. *The Moving about of Whelps by the Vixen.*—This amounts to a vice in some vixens. Richter showed that it occurs among 7·5 per cent. of old and 19 per cent. of young vixens. The idea of the vixen seems to be to ensure the safety of the whelps and very often she carries them about in her teeth till she can scrape a satisfactory hole in which to deposit them. Breeders are inclined to attribute this vice to scarcity of milk, but the author thinks it is due to nervousness on the part of the vixen. Prevention of loss from this cause is to select docile vixens for breeding. Sometimes the provision of two whelping boxes instead of one will check the procedure.

(*B*) One to Six Months.—Losses during this period are ascribed to parasitic and infectious diseases and to other causes.

1. Parasitic ("Invasion") Diseases.

(*a*) *Round Worms (Intestinal).*—Round worms may be found at any time of the year but they cause most damage in the spring and early summer. Breeders realise the danger and carry out systematic treatment. Dosing at 3 to 4 weeks of age is practised and again 2 to 3 weeks later; some breeders dose a third time at a further 2 to 3 weeks' interval. The "worm mixture" is usually contained in capsules, but the author has experimented with tetrachlorethylene given by stomach tube and has had good results. The dose for young foxes is 0·3 grammes per kilo body weight and 0·5 grammes per kilo for adults. The animals are starved for 12 to 24 hours except in the case of suckling whelps. About an hour after the dosing, some greasy food or oil, *e.g.*, castor oil, should be given. There is no need to withhold water. The author takes the precaution of washing out the remains of the drug from the stomach tube with a little ordinary water.

The worms are undoubtedly harboured by the adult foxes though they apparently suffer no inconvenience from their presence. Young foxes may be heavily infested at four weeks of age. In all probability the worm eggs adhere to the pelts of the vixens and thus the whelps have access to them. The correct protective measure is to free the adults from worms. In the autumn before breeding begins, faecal examinations should be made and where necessary treatment of the adults carried out. Pens should be treated with hot water or a solution of hot washing soda. The author reports good results from the use of a layer of sand 10 cm. deep in the pens and the collection of the faeces from the sand for examination.

(*b*) *Hook Worms.*—The part played by soil and grass in the life cycle of the hook worm is now recognised and the method of keeping foxes, therefore, prevents infestation to a great extent. If such parasites are present treatment can be given at the same time as for round worms.

(*c*) *Lung Worms.—Eucoleus aerophilus* (hair worms) belong to the species Trichotrachelidae. The embryonic egg is sufficient to cause infestation. The use of wooden floors or wire floors in the pens reduces the incidence considerably. *Crenosoma vulpis* belongs to the Metastrongyles and certain species of snails are necessary in its life cycle. Prophylaxis lies in preventing the invasion of the pens by snails. Surrounding the pen with ashes or soot or with boards covered with tar or animal oil is effective.

(*d*) *Coccidia.*—As an actual cause of disease in foxes, coccidia do not give rise to much trouble. The parasites are often found in the intestine but without evidence of damage. The author has seen losses among foxes in which coccidia together with some bacterial infection appeared to be the cause. *S. aertrycke* alone appears to be non-pathogenic for foxes but coupled with coccidia, losses from a septicaemic form of *S. aertrycke* infection have been observed. The fox coccidium seems to be host-specific. Coccidia from rabbits and poultry do not appear to infest foxes—they die in the intestine of the fox. The species Isospora of the dog and cat (*I. bigemina*) apparently does not infest the fox.

2. Infectious Diseases.

(*a*) *S. gaertner Infection.*—Losses from this type of infection up to 100 per cent., occur mostly in the North of Germany. Experimentally adults can withstand large doses of the organism though the author found last year that young foxes were not easily infected artificially. As a rule, but not always, *S. gaertner* infection accompanies round worm infestation, especially when the outbreak assumes epizoötic characters. The source of the organism is apparently flesh fed to the foxes. The author has failed to show

that foxes continue to harbour the organism and this is confirmed by Dedić, who examined 325 foxes. The strains recovered are those found in cattle. Following the feeding of cultures, the organism was found in the excreta only during the acute stage of the infection. The infection assumes the character of a septicaemia rather than an enteritis.

S. gaertner infection can be prevented entirely by the feeding of cooked food. The author showed that in one establishment where it was the practice to feed cooked flesh, on one occasion after a meal of imperfectly cooked flesh, an epidemic of *S. gaertner* infection started in the ranch.

Even for young foxes, in spite of popular opinion on the necessity for raw flesh, the author considers cooked flesh quite adequate. He says, however, that raw blood should be fed and also makes the point of the inadvisability of feeding raw flesh during the period of five days before and two days after treatment for worms.

The author has prepared and used vaccine in the prevention of this infection. The vaccine is an anabroth culture and two injections at an interval of eight days are given. He found this method of prevention useful against both experimental and natural infection and thinks there is a future for it.

(*b*) *Infection with Bipolar Organisms.*—Bipolar organisms have been found on many occasions in septicaemic form in young foxes which were also infested with lung-worms and where death occurred rapidly. The *post-mortem* examination of such animals showed a picture similar to that in *S. gaertner* infection. Stress is laid on the swelling of the spleen. Apparently, in Germany, this type of infection is common.

(*c*) *S. suipestifer Infection.*—This organism has been isolated on different occasions by two workers. Clinically and on *post-mortem* examination the condition bears a marked resemblance to infection with *S. gaertner*. No evidence of the source of infection was forthcoming; the foxes had not been fed on the flesh of swine.

(*d*) *Tuberculosis*·—The author found tuberculosis on two occasions in foxes six to eight weeks old. He found evidence that young foxes die very soon after exposure to infection —in one case death occurred within 14 days of eating tuberculous flesh.

(*e*) *S. aertrycke Infection.*—The author holds that there is usually some other cause of death when *S. aertrycke* organisms are isolated from the tissues of a fox. It is commonly found in the intestine of apparently healthy foxes and seems to play the part of a secondary invader.

(*f*) *Inflammation of the Brain (Encephalitis).*—This condition was observed on many occasions in epidemic form. The symptoms are, briefly: sudden illness with nervous symptoms; staring appearance, inco-ordination of movement, unsteadiness, trembling, tonic and clonic spasms over all the body, twitching of the lips, etc. Death follows often within a few minutes of the appearance of symptoms when the animal has reached a stage of unconsciousness. Sometimes there is recovery from an attack and death may occur at the second or third attack. Long relapses are not often found and true recovery seldom takes place. The presence of blood in the urine and faeces during the incubation stage is observed. Both young and adult foxes may be affected though the disease is more common in the former.

It is pointed out that illness with nervous symptoms may be due to several causes, *e.g.*, ear mites, etc., but there also appears to be a specific infectious encephalitis of foxes.

The disease is conveyed from fox to fox but no susceptible laboratory animal has been found. Brain from an infected fox injected intracerebrally into mice appeared to produce symptoms but further passage in mice was unsuccessful. The author thought that he might establish the infective agent in mice as has been done with the virus of horse sickness in South Africa. Dogs were also used but no results followed the injection of infected fox brain into dogs over a year old. At a later date, puppies were used and following intracerebral injection, distemper-like symptoms appeared without the occurrence of symptoms of nervous origin.

Reference is made to the researches of Green and Shillinger who transmitted the infection to puppies, though the nervous symptoms were never so pronounced as in the fox. These authors infected 46·9 per cent. of puppies. Schoop thinks he has not yet used a sufficient number of puppies and also suggests that the question of distemper in the fox requires further investigation.

Attempts were made to produce an immune serum by injecting foxes and, later, dogs intramuscularly with large amounts of infected fox brain. There are, as yet, no definite results of its use to report.

Vaccine was also made and has been used. It consists of formalinised brain from naturally or artificially infected foxes. It has been shown to be non-infective. It is yet too early to report results.

The author thinks that the infection is conveyed in the food and in prophylactic work attention must be paid to hygiene. He gives an instance of the feeding of the carcases of dead foxes, after the pelt has been removed, to all the other foxes in the ranch.

3. Other Causes.

(*a*) *Overloading the Stomach.*—Young foxes are heavy meat eaters and unless their feeding is controlled concerning amount, size of lumps of

flesh and regularity of feeding, there is danger of death following overloading the stomach and subsequent rupture of that organ. The author has seen young foxes eat an amount of food equivalent to one-third their own weight at one meal. It is suggested that each fox should have its ration in a separate bowl and that cubs should be fed at least twice a day.

(*b*) *Effects of Heat.*—In some ranches it was found that many young foxes were affected with different diseases during the same period, *e.g.*, some with pneumonia, others with enteritis, and that such occurrences took place mostly in hot weather. The author went so far as to say he was able to predict the occurrence of illness according to the weather conditions. He thinks hot weather is not conducive to the health of foxes and suggests that shelters should be provided. He points out that in the wild state foxes are able to shield themselves from the hot sun and only come into the open at nights in such weather. He has found mulberry bushes very useful in providing shade.

The article ends with the statements that disease among foxes is considerable and that it is very necessary to carry out many more investigations.

T. D.

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[Laparotomy in the Bovine. Ferguson, T. H. (1938.) Paper to Thirteenth Int. Vet. Cong.]

The author, a practitioner, has practised laparotomy in cattle over a period of 30 years, for such conditions as ovariotomy, removal of growths from the uterus or ovaries, torsion of the uterus, rumenotomy, Caesarian section or merely exploration of the abdominal cavity.

He emphasises the fact that with care and cleanliness entry into the abdominal cavity entails no risk and may save many an animal's life and usefulness.

Laparotomy Technique.—Whenever possible, the operation is conducted with the animal in the standing position, pre-operative narcosis, if necessary, consisting of 1½ to 3 oz. of chloral hydrate as a drench or via the stomach tube.

The site of incision, usually the left flank, is shaved and cleansed with a 1-1,000 alcoholic mercuric chloride solution or tincture of iodine. The skin is anaesthetised by intradermal injection of a suitable local anaesthetic, and the underlying muscles are likewise injected subcutaneously. The line of incision is between the last rib and the external angle of the ilium, its length varying with the operation to be performed. The skin incision at the lower part of the wound should extend beyond the deeper incisions. Before the parietal peritoneum is cut it is swabbed with a 5 per cent. cocaine solution because of its acute sensitivity.

Two methods of repairing the wounds are mentioned. In the first the muscles, fascia and peritoneum are sutured as one layer, using twenty-day chromic catgut, and the skin is closed by means of a continuous lock-stitch suture reinforced by interrupted tension sutures 2 inches apart and 1 inch from the wound edge, using waxed linen suture material. A perforated drainage tube is introduced along the whole length of the muscle wound. Sutures and drainage tubes are removed in from seven to ten days.

The second method consists of the introduction of figure-eight sutures, using waxed linen and suturing skin, muscles and peritoneum as one layer. The needle penetrates the skin on the right side about 1 inch from its edge, and is taken to the left side where it picks up muscles, fascia and peritoneum, in this order. It then traverses the peritoneum, fascia and muscles—in this order—of the right side and crosses over to the left side, where it reappears through the skin about 1 inch from the wound edge. These sutures are placed 2 inches apart, but are not tied off until the edges of the skin wound have been brought together by means of a continuous lock-stitch suture. The lower end of the wound is packed with gauze soaked in etherised iodoform, presumably to ensure drainage, which is removed after 36 hours. Etherised iodoform and powdered boracic acid or carbolised vaseline covers the wound and sutures.

The operation most often practised is that of rumenotomy for the relief of impaction or the removal of foreign bodies from the reticulum, also in a number of cases of thoracic choke and for the removal of placentas which have been suspected of causing a toxaemia.

Technique of Rumenotomy.—The operation is performed with the patient in the standing or recumbent position, according to the degree of intoxication, and the laparotomy wound is conducted as outlined above.

The rumen is exposed and is anchored to the edges of the skin wound by means of a continuous suture. An incision is then made in the rumen, large enough to admit a 6-inch embroidery hoop, placed in the centre of a rubber sheet. Introduced edgewise, the hoop when in the rumen is adjusted and the sheet outside the wound then spread over the animal's flank. A cross incision is made in the rubber encircled by the ring. In this way removal of ingesta from the rumen can be carried out without contaminating either the peritoneal cavity or the wound surfaces. The condition for which the operation was indicated having been relieved, the hoop is removed and the rumen incision is closed with a continuous Czerny-Lembert suture, using linen or catgut. The sutures holding the rumen to the skin are removed and the rumen allowed to recede into the abdominal cavity.

The laparotomy wound is dealt with in the usual way.

C. F.

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[Bacterial, Physical and Chemical Changes in Meat. (Trans. title.) I.—Valenti, E; II.—(including Non-Bacterial Changes) Trawinski, A. (1938.) Papers to Thirteenth Int. Vet. Cong.]

I.—Meat poisoning occurs with less frequency in Italy than in other countries owing to the Italian liking for meat well-cooked (boiled). Attention is drawn to the changes occurring in meat, particularly at the 8th, 12th and 20th hours after slaughter. The importance of Gassner's medium, completed with the addition of glucose, is emphasised in bacteriological meat inspection. The results of 750 such inspections at the Milan municipal abattoir are described. The material came from various processing sections at the abattoir, the meat coming from sick animals, and 39·5 per cent. were found to be of bacterial origin, chiefly saprophytes (*B. coli*, common germs, *B. coli* Standfuss, etc.), which had penetrated through the intestinal wall. Gaertner's bacillus was isolated in three cases in calves, and the Breslau bacillus twice, the first time in a heifer affected with a serious interstitial hepatitis and chronic peritonitis without macroscopic changes in the meat. Lymphatic glands are more often infected than the meat itself, and of 264 cases examined bacteria were found in 257 instances (97·5 per cent.). Of 156 cases showing serious lesions, bacterial contamination was only found in 58 cases. It is concluded that microbes are assimilated by the lymphatic glands or destroyed by the muscular tissues. Bacteriological examination should be regarded as complementary to ordinary meat inspection, as it leads to the discovery of bacteria and toxic agents ,capable of impairing human health.

II.—Pathological changes may be caused in flesh by microbes and parasites pathogenic for animals only, or for both animals and man. Meat is thus classed as either dangerous or not dangerous to human health, and secondly as either fit or unfit, or conditionally fit, for human consumption.

The keeping qualities of meat depend on the physico-chemical changes in dead muscle. In special cases of meat inspection the determination of the *p*H enables one to detect the beginning of harmful processes in the muscular tissue and indicates the state in which the animal was slaughtered.

Serological investigations of meat extracts from animals suffering from cysticercosis or trichinosis by means of the precipitation test yield good results even if the parasitic infestation is but slight and undetectable macroscopically.

D. J. A.

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[The Toxicity of Oil of Turpentine for Domestic Animals. Steyn, D. G. (1937.) *Onderstepoort J. Vet. Sci. and Anim. Indust.* **9.** 2. 591-597. (9 refs.)]

Deaths occurred amongst horses and donkeys after being drenched with a mixture consisting of 4 oz. turpentine, 1 drachm of extract of male fern and 1 pint of linseed oil.

On account of this, the author reviews the literature on the toxicity of turpentine, including symptoms of poisoning and *post-mortem* appearances, and describes experiments conducted on two rabbits and four horses.

The different brands of turpentine are enumerated and it would appear that the toxicity of turpentine varies according to its origin and to the presence of such impurities as paraffin oils, petroleum, benzine, kerosine oil and other volatile hydrocarbons.

Eight experiments were carried out on the four horses, giving varying amounts of oil of turpentine and extract of male fern, the amount of linseed oil remaining constant at 1 pint. The animals were starved for 18 hours prior to being given the mixture.

The author came to the conclusion that the mixture in question constituted no danger to full-grown horses provided they were not suffering from congestion of the kidneys, nephritis or gastro-enteritis. Young animals and those in poor condition should receive only half the mixture, or less.

Only pure unadulterated and unoxidised oil of turpentine should be used.

C. F.

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[A New Blood Parasite of the Fowl. Coles, J. D. W. A. (1937.) *Onderstepoort J. Vet. Sci. and Anim. Indust.* **9.** 2. 301-307.]

Coles describes an apparently new intra-erythrocytic parasite found in blood smears of fowls from New York and Philadelphia. The author also found an organism, morphologically indistinguishable from that seen in the United States of America, in fowl blood smears in South Africa. The parasite is round to oval, 0·5μ to 1·5μ in size and, since pairs of parasites have been found, division by binary fission is suggested. Coles is of the opinion that, all facts considered, the parasite should be regarded as a new fowl haematozoan of possibly low virulence; he prefers not to suggest a name for it as only meagre information regarding its multiplication, mode of transmission, pathogenicity, etc., is available.

J. N. O.

REVIEW

[**Avian Tuberculosis Infections.** By William H. Feldman, D.V.M., M.S. pp. ix+483. Illustrated. Price 31s. 6d. Baillière, Tindall & Cox.]

It may come as a surprise to some that a book of almost 500 pages has been published under the above title. The extent and importance of avian tuberculosis infections is not generally appreciated. This monograph is an excellent example of what can be accomplished by an author thoroughly familiar with the literature of his subject, intimately conversant with its problems and critical in his review. By this work Feldman has set the seal on his reputation, firmly established as a specialist in this field.

The 13 chapters are well balanced, the ample illustrations admirable and the list of references appended to each chapter complete. More than 850 references are carefully related to the findings and conclusions which form the basis of the monograph. The author has not hesitated to indicate where the more enquiring may find a full exposition of any minor or related point.

It is somewhat surprising to find accepted laboratory procedures, such as the staining of tubercle bacilli and the preparation of sections to show these organisms, set out in detail in a work of this nature. This is, perhaps, the result of an effort to make the book "complete" and in this a full measure of success has been attained. Few will fail to find satisfaction when they turn to this book for information on its subject. The occasional excursions into the field of other tuberculosis infections are well chosen and serve their comparative purpose. The essential differences between the types of tubercle bacilli and the pathological processes they engender are faithfully portrayed and emphasised.

The chapters on avian tuberculosis in birds other than the fowl and in mammals are of particular value and show the ability of the bacillus to infect a wide range of hosts. They illustrate the tendency for infection to produce little or no macroscopic lesion—in some species even when microscopic change and countless bacilli are present in certain organs.

The tenth chapter, extending to 55 pages and devoted to the pathogenicity of avian tubercle bacilli for cattle and swine, holds particular interest for all members of the veterinary profession. It forms a valuable essay on an intriguing and important subject. Two quotations indicate Feldman's view. "It is now evident that tuberculosis in certain mammals such as cattle and swine cannot be eliminated until poultry flocks are freed of the disease." "At present one might venture the opinion that if tuberculosis of chickens in the United States is ever satisfactorily controlled, it will be because of financial loss to the swine industry rather than because of a desire to free poultry from the disease."

Few recent additions to veterinary literature have been so generally acceptable. This monograph must find a place in the library of every veterinary institution and be consulted by all who have reason to interest themselves in infections due to the avian tubercle bacillus.

REPORT

[**Nigeria.** Report of the Veterinary Department for 1937.]

The Veterinary Department of Nigeria is, and has been for some years, an independent institution under the sole control of its Chief Veterinary Officer. During the year 1937 this favourable position was further improved by altering the title of Chief Veterinary Officer to that of Director of Veterinary Services, and of the Deputy C.V.O. to Deputy D.V.S. This change in titles should ensure the continued independence of the Department and give to it added prestige. While one sincerely congratulates those responsible for this notable improvement, one would suggest that an organisation similar to that recently introduced in Kenya would be even more suitable and advantageous. In Kenya the Department is composed of two divisions, namely, a field service division and a research division, each under the control of a Deputy D.V.S., who in turn are responsible to the D.V.S. Research and laboratory services are bound to become, if they are not already assuming, a more important part in the activities of the Nigerian Department, and the officer responsible for these services should, in the reviewer's opinion, carry rank accordingly. Furthermore, by the adoption of the Kenya system the narrow viewpoint which laboratory workers tend to take when they are kept in subordination should be overcome and a team spirit be developed within the framework of the whole Department, to its general good.

In Nigeria the veterinary services are concerned mainly with the suppression and prevention of disease and with the development of industries in animal products. They do not undertake animal husbandry beyond the elimination of unsuitable males by castration: livestock improvement by selective breeding and improved husbandry from the point of view of mixed farming is the responsibility of the Department of Agriculture. It is noted that both Departments collaborate in matters of mutual concern without difficulty and with general advantage.

The report of the Director (Captain W. W. Henderson) is somewhat curtailed on instructions from Government, but it indicates quite clearly that the outstanding progress which has been made in recent years to rid the country of rinderpest and other major diseases has been well maintained. In this connection one knows of no better example than Nigeria, of the truth of Dr. du Toit's statement in his Empire broadcast on Veterinary Service, of October 11th last (a copy of which is given in this journal's issue of October 29th, 1938), that "Where veterinary science is independent and enjoys the full confidence of the authorities, there its achievements rank high."

The report of the pathologist (Mr. R. W. M. Mettam) is merely an outline of the routine laboratory work conducted during the year. This was due to the retirement of Dr. Hall and the late appointment of Mr. Mettam in the year. There is, however, an extensive and valuable appendix by Mr. W. G. Beaton, on the husbandry and diseases of goats in the Colony. Mr. Beaton has been engaged for a number of years on this subject and the results of his investigations have cleared up many points of confusion which had previously existed concerning the ailments of goats.

Excluding goats and sheep, the important animal diseases in Nigeria are trypanosomiasis, rinderpest and contagious bovine pleuropneumonia. Other diseases, namely, blackquarter, anthrax, haemorrhagic septicaemia, foot-and-mouth disease, babesiasis, tuberculosis, helminthiasis, epizoötic lymphangitis of horses and rabies in dogs exist, but for the most part are of secondary importance. The suppression of rinderpest has been the chief object of the Department for the past ten years and most of the cattle in the country are now actively immunised against it. The campaign of active immunisation by the sero-virus method has been practised from the onset and with most satisfactory results. There are now 43 immunisation camps in the Northern Provinces alone and over half-a-million animals were vaccinated during the year. This is a great achievement by a Department with only ten European veterinary officers and eleven European stock inspectors. As has been emphasised in previous reports, the menace of rinderpest from neighbouring territories necessitates the continuous immunisation of the young susceptible cattle in the Colony. Trypanosomiasis is widespread along the rivers of Nigeria and until such time as tsetse belts can be restricted the disease will continue to be the greatest obstacle to the expansion of the livestock industry. Pleuro-pneumonia of cattle is more or less confined to certain areas, but there is the constant danger of a widespread outbreak. Culture vaccine is being used as a means of controlling its spread.

The animal population of the Colony as near as can be estimated, is as follows: cattle, 3,052,000; sheep, 2,000,000; goats, 5,620,000; horses, 177,000; donkeys, 466,000; mules, 42; camels, 2,030; swine, 66,169.

W. K.

N.V.M.A. DIVISIONAL REPORT

Lincolnshire and District V.M.A.*

MEETING AT LINCOLN

A meeting of the above Society was held at the Albion Hotel, Lincoln, on Thursday, October 20th, 1938. The President, Major A. N. Foster, O.B.E., was in the Chair and there were also present: Messrs. R. Hudson, W. W. Lang, F. W. L. Gooch, and E. Porter-Smith (Hon. Members); Messrs. R. Swaby, J. MacDonald, T. Hicks, A. Logan, T. J. Keall, C. Weighton, M. R. MacFarlane, G. Eaton, W. Gibson—Hon. Secretary, and L. A. Auchterlonie, J. W. Beaumont, G. A. Moore, and C. P. Inglis (Members); Miss V. Tiliemont-Thomason, Professor W. C. Miller, Mr. J. Ironside, and Mr. O. V. Gunning (visitors).

The minutes of the last meeting, having been published in the *Veterinary Record*, were taken as read and signed as correct by the President.

Correspondence.—Letters of apology for absence were received from: Sir Frederick Hobday, Professor T. Dalling, Dr. W. R. Wooldridge, Major C. Townsend, Messrs. G. Lockwood, G. Gibson, and W. E. Campbell.

A letter from the Secretary of the N.V.M.A. requesting the names of the five members elected to represent the Society on the Provisional Committee of the N.V.M.A. Congress to be held at Yarmouth for 1939. The members elected were Major A. N. Foster (President), Major C. Townsend, Mr. F. W. L. Gooch, Mr. W. K. Townson, and Mr. J. H. Poles, who were proposed by Mr. W. W. Lang and seconded by Mr. R. Swaby.

Election of New Members.—The following were elected as members: Mr. G. A. Moore, proposed by Mr. W. Gibson and seconded by Major T. Hicks; Mr. R. E. Murison, proposed by Mr. W. A. Dickinson and seconded by Mr. W. W. Lang; Messrs. C. P. Inglis and R. S. Smyth, proposed by Mr. C. Weighton and seconded by Mr. T. J. Keall.

Report.—Mr. F. W. L. Gooch read a short report on the Congress of the Royal Sanitary Institute.

*Received for publication December 19th, 1938.

Paper.—Under the heading "Foal Mortality —Report for 1938," Mr. W. W. Lang reported the results of the experimental prophylactic treatment of mares forthcoming from co-operating clients.

The discussion was opened by Professor W. C. Miller, and well sustained.

[Mr. Lang's report, and a report of the ensuing discussion, are reproduced earlier in this issue.—*Editor.*]

Post-Mortem Specimens.—Several interesting *post-mortem* specimens were shown by members.

Other Business.—Mr. Weighton asked the members if they would let him have the numbers and any particulars they could of cases of "grass disease" that had occurred in their districts.

The President concluded the meeting by proposing a vote of thanks to Mr. Lang, Professor Miller and other speakers taking part in the discussion. This was unanimously carried.

At the conclusion of the meeting the members were entertained to tea by the President and Mrs. Foster.

Wm. Gibson, *Hon. Secretary.*

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Feb. 9th.—Annual General Meeting of the Lincolnshire and District Division, N.V.M.A., at Grantham, 2.30 p.m.

Feb. 13th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.

Feb. 15th.—Annual General Meeting of the Scottish Metropolitan Division, N.V.M.A., at the Royal (Dick) Veterinary College, Edinburgh, 3 p.m.

March 2nd.—Voting Papers for R.C.V.S. Council Election issued to members overseas.

July 23rd—28th.—N.V.M.A. Congress at Great Yarmouth and Gorleston-on-Sea.

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PERSONAL

Birth.—Fulton.—Mr. Andrew M. Fulton, of Plantation Vryheids Lust, Demerara, British Guiana, and formerly of Bromborough, Cheshire, and Mrs. Fulton, formerly of Toronto, announce the birth of a daughter on January 5th, 1939.

R.C.V.S. Council Election

June, 1939

The following nominations for election to the Council of the R.C.V.S. have been received. Voting Papers will be issued to members overseas on March 2nd.

Name	*Proposers*
R. E. Glover	J. B. Buxton, T. Dalling.
J. Holroyd	G. H. Locke, J. W. Brittlebank.
W. H. Kirk	J. W. McIntosh, G. H. Wooldridge.
J. W. McIntosh	G. P. Male, G. H. Wooldridge.
G. P. Male	J. W. McIntosh, G. H. Wooldridge.
Sir Arthur Olver	Sir J. M'Fadyean, G. H. Livesey.
A. Spicer	T. Dalling, G. H. Wooldridge.
A. W. Whitehouse	W. Robb, Helen J. Mitchell.
T. D. Young	Sir J. M'Fadyean, Sir F. T. G. Hobday.
W. R. Wooldridge	W. Nairn, T. Dalling.

The last day for the receipt of nominations for Inland Voting Papers is Thursday, May 4th. 4th.

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R.C.V.S. OBITUARY

Gosling, James Arthur, Mimosa, Collingwood Road, Clacton-on-Sea. Qualified Glasgow, April 28th, 1881. Fellowship January 28th, 1887. Died January 28th, 1939; aged 80 years.

Herbert, Robert Currie Thomson, 44, Milnrow Road, Rochdale, Lancs. Graduated Edinburgh, April 17th, 1872. Died January 24th, 1939; aged 86 years.

Mr. Robert Herbert, M.R.C.V.S.

Mr. Robert Herbert, whose death we record with much regret, had practised for 53 years in Rochdale, where he was a popular and much respected figure, for not only was he an admirable practitioner, but his interest in local sporting and other activities was very keen and wide.

The *Rochdale Observer* says of him: "A native of Corstorphine, near Edinburgh, he came to Rochdale as a young man as assistant to Mr. Howell, then in practice here as a veterinary surgeon, but after a while left England with his parents for New Zealand. Ten years later he returned to take up again his partnership with Mr. Howell in Rochdale, and had remained here ever since, 18 months ago being joined in partnership by Mr. P. Bannister. Amongst the appointments he held was veterinary surgeon to the Rochdale Corporation, later part-time

officer for the Lancashire County Council, which included supervision of Bury, Heywood and Rochdale. He maintained these offices until April last, when, under the new scheme of the Ministry of Agriculture and Fisheries, he was appointed a panel "B" inspector.

"Apart from his work he was an active Freemason, originally joining the movement in New Zealand in 1875. His interest in the Hornets' Football Club goes back to the "nineties," when he became a member of the committee, the club at that period playing on the Dane Street ground. For a number of years he was the club treasurer, and when the present company was formed in 1906 he joined the directorate. He was for some years the representative of the club on the Lancashire County Union. About four years ago he retired from the Hornets' directorate, and was elected a life member. He held a similar honour with the Castleton Bowling Club. Another of his interests in his younger days was shooting, and he possessed many trophies of the Rochdale, Thornham and Todmorden Gun Clubs.

Mr. Herbert is survived by Mrs. Herbert and two daughters—Mrs. Barker, wife of Mr. J. R. Barker, M.R.C.V.S., D.V.H., of Hereford, and Mrs. J. W. Taylor, of Tweedale Street, Rochdale, to whom we extend deep sympathy in their great loss.

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Porrett, John Ernest; Thornage, near Holt, Norfolk. Captain late R.A.V.C. Graduated London, December 13th, 1894. Died January 31st, 1939.

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LEGAL NOTES

Failure to Report Anthrax.—At Southwell Police Court on January 21st, Robert William Shacklock, of "Corner Ways," Edwalton, farmer and cattle dealer, and his farm foreman, William Cumberland, of Manor Farm, Upton, were fined £15 and £3, respectively, for failing to report anthrax in an animal.

Mr. Henry Walker, M.R.C.V.S., veterinary inspector to the Ministry of Agriculture, giving evidence, said that on Monday, December 5th, he received certain information from Captain Godber, a Southwell veterinary surgeon. In consequence of this and other information received from a butcher at Southwell, he went to Manor Farm, Upton.

Mr. Cumberland told him that he had found the animal lying on its side with its legs rigid, and had communicated with Mr. Shacklock by telephone. On instructions from Mr. Shacklock defendant Cumberland sent for a Southwell butcher to come and dress the beast.

The butcher arrived between four and five o'clock, and dragged the beast from the crew-yard, to kill it on a cement yard. The blood from the beast ran down the yard and into the corner of the crew-yard, where there were other beasts. The carcase was then dragged to a corner of the stack-yard and into a barn. Here it was suspended from the rafters and dressed. Gross contamination of the whole barn had been caused by anthrax blood. The next day the waste matter from the stomach and bowels of the beast was taken to a field 250 yards away and scattered.

Witness said he saw Mr. Shacklock and asked him why he had not engaged a veterinary surgeon to come and examine the animal prior to having it slaughtered. Defendant said he thought the animal was suffering from castor bean poisoning.

Asked why he did not take steps to find out, defendant replied: "The beast was in a fine fat condition, and if it was slaughtered it might be possible to salvage some of the carcase," adding that he thought it would probably be submitted to the local sanitary authority to see if it was fit to be used for human food.

"Any condition in a live animal that would mean it being killed when on the point of death would necessarily render it unfit for food," said witness.

Later on he saw the carcase and took a swab of the blood, which on microscopic examination revealed anthrax. In consequence of this he gave instructions for the animal to be burnt and the whole premises to be disinfected.

In reply to a question by Superintendent Burley, witness said that five or six times more cleansing was necessary than in an ordinary case of anthrax.

"If defendant had sought professional advice," said Mr. Walker, "there would have been less contamination of the premises, and no risk to the other stock and people examining the carcase."

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WORLD'S RECORDS FOR WILTS. COW

The Farmers' Weekly of January 27th states that three world records are now held by the red Shorthorn cow, Cherry, owned by Messrs. Wort & Way, Amesbury, Wiltshire, and adds: "Last week the cow set up a new world lactation record for her breed. By her yield up to her second milking on January 19th, Cherry achieved a yield of 33,289¼ lb. of milk in 288 days since calving. The previous record was held by Beggarmaid, the property of Captain W. S. Fielding-Johnson, of Compton Bassett, and stood at 33,240 lb. in 365 days. Thus Cherry has eclipsed this by 49 lb. in 77½ fewer days. The cow's other world records are for daily yield (140 lb.) and weekly yield (961¼ lb.).

"Her yields still show little sign of dropping. She has never given a daily yield of less than ten gallons since calving on April 6th last year, and her daily yields on the five days preceding January 19th were 111¼ lb., 109¼ lb., 110¾ lb., 107¾ lb. and 111¼ lb. Her first two milkings on January 19th yielded 50¾ lb. together.

"Cherry has been tested for butter-fat, and at the last test returned the figure of more than 5 per cent.

"In view of her excellent condition and her unvarying appetite, there is every possibility that she will go on to break the two remaining records. First of these is the British milk record for all breeds, held by the Friesian Findlay Clara 2nd at 36,120 lb. in 365 days. At her present level of daily yields, Cherry should top this figure during February. Finally, there is the world record yield for cows of any breed, set up by an American Holstein-Friesian, Carnation Ormsby Butter King. This stands at 38,606 lb. in 365 days. If Cherry's yield drops to a bare 10 gallons per day by the anniversary of her calving, she will have beaten this record by more than 200 gallons.

"Mr. Alex McKie, who is in charge of the cow, feels confident that even though Cherry may fall short of becoming the world's first 4,000-gallon cow, she will beat Ormsby Butter King's record."

Like Danzig, Memel is German already in all major respects, though still under nominal control of the Lithuanian Government. Memel has its own local Fuehrer, Dr. Neumann, a veterinary surgeon. He is a serious-minded, steel-eyed man approaching middle age, and models his speeches and style of oratory on the well-known Hitler pattern.—*Bernard Gray in the "Sunday Pictorial."*

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Ministry of Agriculture veterinary officers recently have been busily engaged in combating an outbreak of sheep scab which occurred on the borders of West Yorkshire and Westmorland. Districts affected include Brant Fell, Langdale Fell and Ravenstonedale. A double dipping Order has been imposed and dipping is carried out on both sides of the border. Nine inspectors have been sent to Westmorland.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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POTENCY OF SYNTHETIC TUBERCULIN

To the Editor of the Veterinary Record

Sir,—I am amazed that it should be suggested at the present time of Ministry Surveys that the potency of tuberculin should be increased. The survey of the cattle is being viewed with suspicion by the owners, at all times the most conservative of men, and to use a tuberculin now that would increase the number of reactors at the second and Official Ministry tests would spell immediate ruin to the whole scheme.

The present tuberculin finds the vast majority of reactors. Also, it finds occasional sensitised contacts with reactors. Is that not sufficient for the time being? Any increase in strength will only automatically increase the "doubtfuls" as well, and, as it is at present, there are times when we have to search very hard to find a macroscopic lesion on the *post-mortem* of a reactor.

However, that is all by the way, and the fact remains that unless we want to spell disaster for the Ministry survey work, we had better leave well alone until we have got the confidence of the herd owners.

Is there not an old adage about, "Changing horses in the middle of a stream"? It certainly applies on this occasion.

Yours faithfully,
H. W. Brekke.

Victoria Road,
Darlington.
January 29th, 1939.

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WHITE HEIFER DISEASE

To the Editor of the Veterinary Record

Sir,—The recent letters on the subject of "White Heifer Disease" have raised points of interest in a condition which I have never found properly described in veterinary literature before.

I have had many cases of white heifer disease, or what might be called "utero-vaginal abscess" in white Shorthorn heifers, one such in a blue-roan heifer and one in a red-roan heifer. All these animals were between 15 and 20 months old, one only being a maiden, and Mr. Hart's description of the condition is exactly my experience also. I have never been able to find any trace of a hymen in any of these cases, the obstruction being usually reminiscent of the vagina in severe uterine torsion. In one case only have I found a condition that might have been described as a "congenitally misplaced hymen"—a bi-concave disc of fibrous tissue covered on the outside surface with vaginal mucous membrane situated across the genital passage about seven inches from the opening of the vulva. Some few of these cases were put to the bull after apparent recovery under the usual treatment but none conceived. Vaginal constriction in white heifers at the identical position of the obstruction in all the above cases has given me some of the most arduous embryotomies I have ever had to perform, and on two occasions the obstruction to delivery has been so formidable that I have had to perform Caesarian section, an operation I only use in cattle when delivery is absolutely impossible by other means.

I have seen one case of true persistent hymen as described by Mr. Hart, and that was in a white heifer in labour. The hymen was in the normal position just in front of the meatus urinarius and was visible each time the heifer strained. I made a crucial incision (without rupturing the foetal membranes) with a scalpel and scissors, and the heifer delivered herself of a live calf in ten minutes while I stood and watched.

It is reasonable, therefore, to assume that there is a vaginal peculiarity of cattle which sometimes takes the form of a hypertrophied hymen but more often the form of a deformed vagina with complete absence of hymen, which peculiarity is always inherited along with complete, or nearly complete, absence of pigmentation. It also appears that when the vaginal deformity occurs and is so pronounced as to obliterate the genital canal, white heifer disease, or utero-vaginal abscess, as I have called it, results. If the abnormality is such that copulation can take place (*i.e.*, if there is an opening through the obstruction), a pregnancy follows service which may terminate in a severe dystocia. On the other hand, should the inherited peculiarity take the form of a hypertrophied hymen in the correct position, white heifer disease does not ensue, pregnancy may occur without surgical interference and such pregnancy may result in a benign dystocia.

Mr. Crosfield's description of the vagina *alone* distended with pus with a normal uterus is very interesting. I have suspected that condition on occasions, but have never been able to satisfy myself on the point and never yet have I had a case where I could get my whole hand through the obstruction to examine the *os uteri*. I cannot remember ever having felt the bifurcating groove on the upper surface of the uterus or the horns in such a case, and I have always imagined the *os* to be wide open and the vagina and uterus confluent. I have had experience of the "double vagina" abnormality mentioned by Mr. Tutt, but I have never seen it in a white or a roan animal. I am familiar with the "fleshy bands" referred to by Mr. Hart, but I have always seen them, singly or in pairs, uniting the roof to the floor of the vagina, but never across it. One cow I knew calved three times without rupturing two such bands. I believe these fleshy bands to

be congenital peculiarities, although one practitioner whose opinion I valued highly, once told me that he considered them the result of adhesions of opposite surfaces of the genital canal following abrasions at parturition.

Yours faithfully,
HUGH CURTIS.

Reading.
January 26th, 1939.

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INFECTIOUS ROUP IN YOUNG CHICKENS

TO THE EDITOR OF THE VETERINARY RECORD

Sir,—I have read with great interest Dr. Purchase's article on an outbreak of infectious roup in young chickens, but would point out that his statement that de Blieck holds that his vaccine immunises against both roup and fowl pox is incorrect. The vaccine concerned, "Antidiphtherin," does not immunise against infectious coryza, and I believe it is true to state that Dr. de Blieck has never claimed that his vaccine is of value other than against fowl pox.

I was particularly interested in the symptoms shown by the infected chicks in Dr. Purchase's experiments, because in 1935, in association with Mr. O. R. Stevenson, County Adviser in Poultry-keeping for East Sussex, we investigated an outbreak of infectious coryza amongst young chicks, and the symptoms were more or less identical with those described by Purchase, except that there was much great involvement of the infra-orbital sinus. The incubation period was five days, and it was concluded the cause was a virus. At that time, our attention had been directed for the first time to the question of infectious laryngo-tracheitis in chicks, and in an account of the outbreak as published in *Chanticleer*, I reported, "During the last few weeks, the writer has experienced a disease in young chicks which appears to correspond in many respects with that seen in America (infectious laryngo-tracheitis)."

It is now clear that what we were investigating was infectious roup as described by Purchase, and not infectious laryngo-tracheitis, although there is often a strong resemblance between both these diseases in chicks, and I was somewhat surprised to find that Dr. Purchase did not consider this when discussing differential diagnosis; and also that there should be any confusion between an outbreak of gapes (in chicks) and roup.

Incidentally, it is the opinion of de Blieck that the primary causal organism in infectious coryza is the *Haemophilus coryza gallinarum* bacillus, and that the coccus-like bodies of Nelson are only of secondary importance.

Similarly, de Blieck never considers *Pasteurella avicida* a primary factor in roup, no matter what age the birds, nor does he believe that a virus plays a part in the pathogenesis of roup.

Yours faithfully,
W. P. BLOUNT.

"The Pantiles,"
Corsica Road,
Seaford.
January 26th, 1939.

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RABIES NOT ABSENT IN VENEZUELA

TO THE EDITOR OF THE VETERINARY RECORD

Sir,—In reference to the discussion by Dr. T. W. M. Cameron on Professor Edward Hindle's paper on Filterable Viruses, etc., as reported in the *Veterinary Record* of October 8th, 1938, p. 1336, there appears the following: "In South Africa, where the yellow mongoose is the main carrier of rabies, and where rabies, as in Trinidad and the *Spanish Main* is almost entirely absent in dogs . . ."

Having resided for nearly a quarter of a century in Venezuela, a republic which is only separated from the island of Trinidad by a narrow stretch of water, I must state from experience that rabies in the dog is quite prevalent here in Venezuela, but more so in the fox as well as in other wild animals such as the skunk, etc.

In the dog, "dumb rabies" is more prevalent than "furious rabies," yet we meet cases of furious rabies in this animal. Until recent years the writer was the only veterinary surgeon in this country, which has the combined area of Great Britain, France and Holland, so only a very small fraction of the dogs suffering from rabies was able to be seen, but more so on the plains, where the fox and other wild animals are so numerous and where dogs are kept in great numbers. The writer had the misfortune about three years ago to see his imported pedigree English bulldog developing furious rabies as a result of fighting and killing a skunk in his kennel. The dog was kept for several days after the first manifestation of rabies, thinking it was a case of dumb rabies, but in the course of a few days the dog commenced to attack other animals, so it was decided to put him out of his misery and thus avoid serious consequences. In the majority of rabies cases which we are called to see, they occur in sporting dogs. It is generally found that the dog has been bitten by a fox whilst out hunting deer, etc.

In the interior of the country, where the grey fox can be seen, staring at one on every acre bordering forests, they come when rabid around, and even enter, so-called dwelling houses. At night the inhabitants sling their hammocks high so as to avoid these animals. During the daytime it is more dangerous as they often come suddenly around and bite young children. On one occasion several years ago while Dr. Nuñez Tovar, a scientist well known to the Liverpool Tropical School, and the writer were working on mal-de-Caderas, I saw a small boy suffering from "rabies," having been bitten by a fox sometime previously. I hope I shall never see such a pitiful case again.

Fortunately the country has been free of foot-and-mouth disease for at least 25 years, but not so of anthrax, which is as prevalent here as foot-and-mouth disease on the continent of Europe and also in the Argentina. Yet the hides from the cattle dying of anthrax in the interior of the country are exported very often as "sun-dried" hides to different countries. It would be interesting to know whether Great Britain disinfects imported sun-dried hides from different countries at the port of entry, as the Bureau of Animal Industry of the U.S.A. demands when importing into their country. Trinidad, being an island like Great Britain, has the advantage over a vast continent like the South American Republics in controlling diseases such as rabies, and also in having such an efficient veterinary service, much to the regret of some of the Venezolanos who sometimes attempt to smuggle their sporting dogs into the island.

Yours faithfully,
EDWARD MORGAN.

Valencia,
Venezuela,
South America.
January 3rd, 1939.